Where RCD protection for socket-outlets can be omitted

This article looks to discuss issues raised by the IET’s updated On-Site Guide to BS 7671:2008(2011) relating to the intended omission of RCDs. The inclusion of such guidance in the On-Site Guide has prompted much debate within the electrical industry, which, it must be emphasised, is a very good thing. This article discusses RCD protection for socket-outlets only and does not consider the requirements for the protection of cables in walls.

By Mark Coles
**Scope of the On-Site Guide**
First, let's look at the scope of the On-Site Guide and what it is intended to be used for.

The Guide is for installers (for simplicity, the term installer has been used for electricians and electrical installers) and covers the following installations:

a. domestic and similar installations, including off-peak supplies, supplies to associated garages, outbuildings and the like
b. small industrial and commercial single- and three-phase installations.

**This Guide is restricted to installations:**
1. at a supply frequency of 50 hertz
2. at a nominal voltage of 230 V a.c. single-phase or 230/400 V a.c. three-phase
3. supplied through a distributor's cut-out having a fuse or fuses rated at 100 A or less

**Guidance**
The particular clause prompting discussion in the On-Site Guide is 3.6.2.2 and is reproduced here:

**Installations under the control of skilled or instructed persons**
BS 7671:2008(2011) permits RCDs, where usually provided for additional protection, can be omitted where the installation is under the control of a skilled or instructed person.

The decision as to which socket-outlets or circuits do not require additional protection by RCDs should be taken by the designer of the electrical installation and only after consultation with an appropriate person in the client's organisation. An appropriate person would be one who is able to ensure that the socket-outlets or circuits in question are, and will remain, under the supervision of skilled or instructed persons.

Wherever a designer so chooses to omit RCD protection, traceable confirmation must be obtained from the client to identify the reason for the omission and such confirmation shall be included within the documentation handed over to the client upon completion of the work.

Where no such confirmation can be obtained, RCD protection should not be omitted.

The guidance in clause 3.6.2.2 in the On-Site Guide looks to support installers working on smaller installations no greater than 100 A, which is in line with the scope of the Guide.

**The requirements of BS 7671:2008(2011)**
Additional protection is that which is extra to the fundamental requirements in BS 7671:2008(2011) for basic and fault protection. It is to be provided to protect users in the event of failure of the provision for basic protection and/or the provision for fault protection or carelessness by users.

Regulation 415.1 states that the use of RCDs with a rated residual operating current (IΔn) not exceeding 30 mA and an operating time not exceeding 40 ms at a residual current of 5 IΔn is recognised in a.c. systems as additional protection.

Regulation 411.3.3 sets out the requirements for additional protection by means of an RCD in accordance with Regulation 415.1:

i. socket-outlets with a rated current not exceeding 20 A that are for use by ordinary persons and are intended for general use, and

ii. mobile equipment with a current rating not exceeding 32 A for use outdoors.

An exception to (i) is permitted for:

a. socket-outlets for use under the supervision of skilled or instructed persons, or
b. a specific labelled or otherwise suitably identified socket-outlet provided for connection of a particular item of equipment.

**Competency**
Electrical installations must always be designed by competent persons. This competent person must be fully aware of the extent of the work or daily activity intended, for which, the electrical installation will be installed to support.

As a point of clarity, some installation work, such as minor additions and alterations, could be very small and, even though no pen has been put to paper, a design process will have been utilised, albeit a mental design process.

**Scenario**
Consider the following scenario: a small commercial installation has been designed and installed by an electrical contractor. Socket-outlets in an office have not been protected by an RCD with a rated residual operating current of 30mA, as required by Regulation 411.3.3(a) – the reason being that the operator of the electrical installation, usually the employer, has stated that the installation will be under the supervision of a skilled or instructed person. After some time, during which, the electrical installation has
Based on a discussion.

Evidence, the design was not to be protected with RCDs. The only protection that would be required was the supervision of a skilled or instructed person at the installation in a dwelling, e.g. an office. The client told him the installation was to be used by cleaners, and that only the company's appliances would be used. The company's policy was to ensure that no RCD protection for socket-outlets specifically for the use of IT equipment. In this situation, the designer could choose to omit RCD protection by reference to Regulation 411.3.3(a).

Should the designer chose to omit RCD protection, in accordance with Regulation 411.3.3(b), the sockets-outlets would need to be suitably labelled or otherwise identified. The designer, who will be a competent person, will of course be able to demonstrate the reasons for omitting RCD protection as determined during the designer's risk assessment if called to clarify.

### The designer's decision process
In a commercial situation, for example, such as an office environment, where the employer states in company policy that employees must not bring in appliances, such as phone chargers and radios and that only the company's tested appliances can be used, then RCD protection for socket-outlets can be omitted.

Where socket-outlets are provided for use by cleaners, for example, RCD protection should not be provided for use by cleaners, so the designer can choose to omit RCD protection.

### Table 1 – Classification of person

<table>
<thead>
<tr>
<th>Defined term</th>
<th>Definition</th>
<th>Example of who the person could be</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled person</td>
<td>A person with technical knowledge or sufficient experience to enable him/her to avoid dangers which electricity may create.</td>
<td>Building maintenance electrician</td>
</tr>
<tr>
<td>Instructed person</td>
<td>A person adequately advised or supervised by skilled persons to enable him/her to avoid dangers which electricity may create.</td>
<td>Building manager (non-technical)</td>
</tr>
<tr>
<td>Competent person</td>
<td>A person who possesses sufficient technical knowledge, relevant practical skills and experience for the nature of the electrical work undertaken and is able at all times to prevent danger and, where appropriate, injury to him/herself and others.</td>
<td>Electrical designer</td>
</tr>
<tr>
<td>Ordinary person</td>
<td>A person who is neither a skilled person nor an instructed person.</td>
<td>Employee (non-technical)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Member of public</td>
</tr>
</tbody>
</table>

Taking this scenario, the On-Site Guide instructs such that:

"Wherever a designer so chooses to omit RCD protection, traceable confirmation must be obtained from the client to identify the reason for the omission and such confirmation shall be included within the documentation handed over to the client upon completion of the work."

It further advises that:

"Where no such confirmation can be obtained, RCD protection should not be omitted."

### Classification of person
It is pertinent to look at who these skilled or instructed persons are; see Table 1. The definitions are taken from Part 2, Definitions, of BS 7671:2008(2011) and an example is given of who the person could be.

It cannot be argued that an installation in a dwelling, e.g. house or flat, will be constantly under the control of a skilled or instructed person; an example being that visitors will bring their non-tested apparatus and plug them into socket-outlets. Therefore, all socket-outlets for general use in a dwelling are to be protected by RCDs rated at 30 mA. As highlighted earlier, Regulation 411.3.3(b) permits the omission of RCD protection for a specific labelled or otherwise suitably identified socket-outlet provided for connection of a particular item of equipment; an example of this is the provision of a non-RCD protected socket-outlet for the connection of a fridge-freezer. Such a labelled and non-RCD protected socket-outlet would not be intended for general use.

**Larger installations**
Where larger installations are designed and installed, i.e. those greater than 100 A and beyond the scope of the On-Site Guide, there may be many circuits which require a decision to be made over whether RCD protection should be provided or omitted during the designer's risk assessment process. In such situations, the client is likely to be looking to the designer for guidance and advice and to design a suitable installation fit for the work intended to be carried out in the building. Should the designer be assured that the installation will be under the control of a skilled or instructed person at all times and throughout the expected life of the installation then additional protection by RCDs, as permitted by Regulation 411.3.3(i), could be omitted. An example could be the installation of socket-outlets specifically for the use of IT equipment. In this situation, the designer could choose to omit RCD protection by reference to Regulation 411.3.3(a).

Should the designer chose to omit RCD protection, in accordance with Regulation 411.3.3(b), the sockets-outlets would need to be suitably labelled or otherwise identified. The designer, who will be a competent person, will of course be able to demonstrate the reasons for omitting RCD protection as determined during the designer's risk assessment if called to clarify.
can be omitted if precautions are taken, i.e. company policy states that all appliances are tested, regularly inspected and that the socket-outlets are not to be used for any other purpose.

Where there is no company policy describing the situations above and employees are free to use socket-outlets at will, RCDs, providing additional protection at 30 mA should be included within the design for the circuits in question as the use of the installation is not policed.

**Departures from the Regulations**

Consider the scenario posed earlier where socket-outlets are not protected by an RCD and are not under the supervision of skilled or instructed persons as required by Regulation 411.3.3. This may be an intended departure from the Regulations but does not meet the criteria for departures.

It is worthwhile discussing departures from the Regulations too. BS 7671 permits intended departures from the Regulations – the requirements are very specific but two conditions would be acceptable.

**The first condition:**

120.3 Any intended departure from these Parts (1 to 7 of the Regulations) requires special consideration by the designer of the installation and shall be noted on the Electrical Installation Certificate specified in Part 6. The resulting degree of safety of the installation shall be not less than that obtained by compliance with the Regulations.

In Regulation 120.3, the key words are “The resulting degree of safety of the installation shall be not less than that obtained by compliance with the Regulations”.

Consider the scenario posed earlier where socket-outlets are not protected by an RCD and are not under the supervision of skilled or instructed persons as required by Regulation 411.3.3.

If it is decided that additional protection by use of an RCD rated at 30 mA is not to be provided then some other method, equal in terms of safety to protection against electric shock by additional protection, should be adopted to ensure that the resulting degree of safety of the installation shall be not less than that obtained by compliance with the Regulations.

Regulation 410.3.3 gives four methods of protection against electric shock which are generally permitted:

i. Automatic disconnection of supply (Section 411)
ii. Double or reinforced insulation (Section 412)
iii. Electrical separation for the supply to one item of current-using equipment (Section 413)
iv. Extra-low voltage (SELV and PELV) (Section 414).

Beyond the implementation of automatic disconnection of supply with additional protection by use of an RCD rated at 30 mA, given in Regulation 410.3.3(i) and Regulation 411.3.3, it is very unlikely that any of the other three generally permitted measures with an enhancement will be suitable in the posed scenario.

**The second condition:**

133.5 New materials and inventions

Where the use of a new material or invention leads to departures from the Regulations, the resulting degree of safety of the installation shall be not less than that obtained by compliance with the Regulations. Such use is to be noted on the Electrical Installation Certificate specified in Part 6.

Regulation 133.5 permits the use of a new methodology or item of equipment that may not have been manufactured to a British or other Standard, again, the requirement is that “the resulting degree of safety of the installation shall be not less than that obtained by compliance with the Regulations.”.

**Summary**

For installations falling within the Scope of The IET’s On-Site Guide, wherever a designer so chooses to omit RCD protection, traceable confirmation must be obtained from the client to identify the reason for the omission and such confirmation shall be included within the documentation handed over to the client upon completion of the work. Where no such confirmation can be obtained, RCD protection should not be omitted.

For installations beyond the Scope of The IET’s On-Site Guide, the designer may decide to omit additional protection by RCDs, the decision being based on their knowledge of the client’s requirements and how the installation will be used.

The designer will, as a matter of course, retain all design information, such as the risk assessment, calculations, etc. and clearly stating why particular decisions were made in the Design File and/or CDM File.

Finally, listing departures on the Electrical Installation Certificate will only meet the requirements of the Regulations if the resulting degree of safety of the installation is not less than that obtained by compliance with the Regulations.

**Thanks**

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